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The Composition of a Colony of *Philoponella raffrayi* (Uloboridae) in Peninsular Malaysia

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桝元敏也[1]：マレー半島における *Philoponella raffrayi* のコロニー構成

Abstract A colony of *Philoponella raffrayi* (SIMON, 1891) was observed in the undergrowth of the secondary forest of the Forest Research Institute of Malaysia in Kuala Lumpur, Malaysia. The communal web was made up of 1) numerous females' orb-webs surrounding the colony, 2) strong sustainable silks which constitute irregular framework of the colony, and 3) irregular webs forming the center of the colony where males dominantly exist. The numbers of adult females, adult males, and juvenile females were 61, 15 and 2, respectively. The distribution of the developmental stages of the individuals in the colony indicates that the spiders have matured simultaneously. Three other species of spiders, *Portia* sp., *Leucauge* sp. and *Argyrodes* sp., were collected in the colony of *P. raffrayi.*

Introduction

Members of the genus *Philoponella* occur in South and Central America and in tropical Asia and the western Pacific (LUBIN, 1986). Many species in this genus are found in colonies consisting of numerous orb-webs built in a common, irregular framework (OPELL, 1979). *Philoponella raffrayi* (SIMON, 1891) was reported as a social spider in Singapore (SIMON, 1891). However, there have been no reports on the composition of the colony of this species. In this report, the composition of a colony of *P. raffrayi* observed in Malaysia will be described.

Methods

A colony was observed on 9 and 23 March 1991 in the undergrowth of the secondary forest of the Forest Research Institute of Malaysia, in Kuala Lumpur. I recorded the number of insects entering the colony and the number of females feeding prey from 11:30 to 12:00 on 9 March. All spiders in the colony were captured on 23 March, preserved in 70% alcohol and brought to the laboratory

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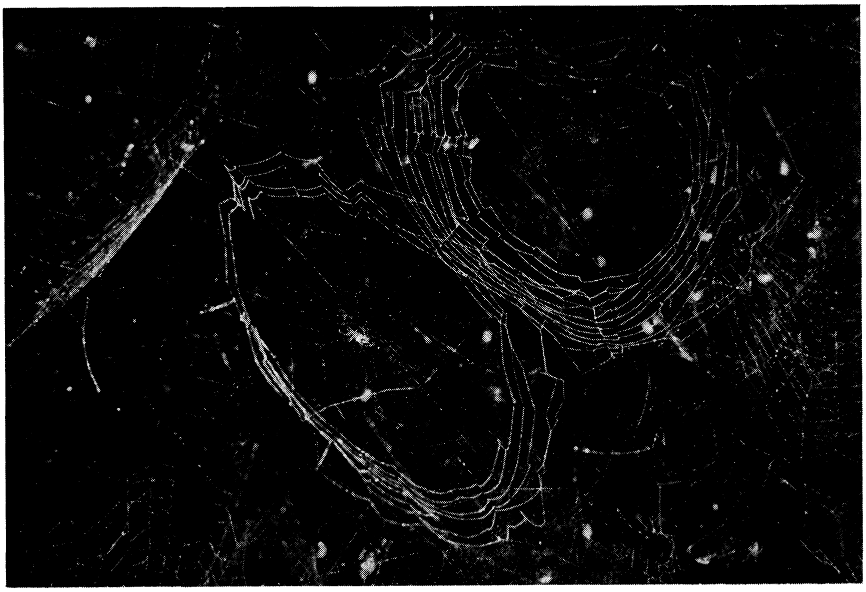

Fig. 1. Communal webs of *Philoponella raffrayi* (diameter of each web about 10 cm).

in Japan. Body length, cephalothorax width and color of abdomen were determined under a binocular microscope. Measurements are represented as mean ± S.D.

Results

The size of the colony web was 0.6 m long, 0.6 m wide and 0.7 m high on 9 March, but became 2 m long, 2 m wide and 3.5 m high on 23 March. The communal web was made up of three parts as follows: 1) numerous females' orb-webs (the diameter of each web was about 10 cm; Fig. 1) surrounding the colony, 2) strong sustainable silks which constitute the irregular framework of the colony, and 3) irregular webs forming the center of the colony where males dominantly exist. The numbers of adult females, adult males, and juvenile females were 61, 15 and 2, respectively (Table 1). Sex ratio was biased towards female (male : female and juvenile female = 15:63). No juvenile males were collected on 23 March. Body lengths of males and females were 3.15±0.17 mm (14) and 6.21±0.40 mm (58), respectively; cephalothorax width of males and femaels were 1.03±0.06 mm (15) and 1.53±0.07 mm (61), respectively (sample numbers in parentheses).

Of 50 females randomly chosen, 10 females were eating wrapped ray. I observed 8 flies, 3 bees and 1 wasp entering the colony for 30 minutes. However, they could escape from the colony, all but one fly. No individual attacked these insects with the exception of a few individuals captured a feeble crane fly trapped in the webs.

Table 1. Sex and color of abdomen of *Philoponella raffrayi* in the colony captured in the undergrowth of the secondary forest of the Forest Research Institute of Malaysia in Kuala Lumpur, Malaysia, on 23 March 1991.

Sex	Color of abdomen	No. of individuals
Adult female	Black	1
	Black and white	9
	Orange	51
Adult male	Orange	15
Juvenile female	Orange	2
Total		77

One juvenile of *Portia* sp., one female juvenile of *Leucauge* sp. and one adult male of *Argyrodes* sp. were collected in the colony of *P. raffrayi.*

Discussion

The color of female abdomen changed from orange to black according to age. The distribution of the developmental stages of the individuals in the colony indicates that the spiders have matured simultaneously in *P. raffrayi.*

Sex ratio of mature spiders of *P. raffrayi* was biased towards female like many other social spiders (AVILES, 1986; FRANK, 1987). This female-biased sex ratio shows possibility of inbreeding, because females inbred system will produce only enough males to mate with the females present (HAMILTON, 1967). In a social spider species, *Agelena consociata*, spiders within a colony were highly related (ROELOFFS & RIECHERT, 1988). But the genetic distance between individuals within a colony is unknown in the genus *Philoponella.* Further studies on the formation of colonies and the genetic structure of spiders within a colony will elucidate the evolution of aggregation behavior of the spiders of the genus *Philoponella.*

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摘要

マレーシアのクアラルンプールにある Forest Research Institute of Malaysia の二次林下層部において *Philoponella raffrayi* のコロニーを観察した．その集合性の網は，雌がいるコロニーの周辺部の円網，コロニーの不規則な枠を支えている強い糸および主に雄

がいるコロニーの中央部の不規則網からなっていた．成体雌，成体雄および亜成体雌のコロニー内の個体数はそれぞれ61匹，15匹，２匹であった．成長段階の分布を考慮すると，コロニー内の各個体はだいたい同一時期に成熟すると考えられる．*P. raffrayi* 以外に *Portia* sp., *Leucauge* sp., *Argyrodes* sp. もコロニー内から採集された．

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